Semiannual Progress Report

for

NASA Grant NAG5-637

International EUV Spectral Imager/Hitchhiker (IEH) Program

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For Period through September 1994

Continuation Proposal for NASA Grant NAG5-637

"International EUV Spectral Imager/Hitchhiker (IEH) Program"

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UVSTAR

Summary

·A science team meeting was held in conjunction with the DPS meeting in October 1993.

·Our Italian collaborators delivered the UVSTAR hardware in April 1994.

·The hardware as delivered was sent to GSFC for vibration testing.

·Special testing was required on the roller assemblies, the drive screw and nut, and the graphite epoxy composite rods.

·Our Italian collaborators prepared tracking software and delivered it early in August.

·The telescope off-axix paraboloid mirrors were delivered. They were subsequently coated with SiC by the optical research group headed by Ritva Keski-Kuha at GSFC.

·The gratings were received and coated similarly.

·Assembly of the experiment continues with delivery scheduled for mid-November.

UVSTAR Science Meeting - DPS Meeting - October 1993

Most of the UVSTAR science team was present. We discussed the schedule and instrument operation to familiarize the team with the program.

Experiment sequence planning was discussed. We estimated that a detailed plan would begin to develop early in the new year after CIR (Cargo Integration Review).

Under new business, a proposal forwarded by our Italian collaborators was described. They would like to build a second UVSTAR instrument for shuttle flight. In this case, they would build the complete instrument but as their partners we would sponsor the shuttle flights and adapt the experiment to planetary research.

The interest in such a program had some charm for planetary science. The UVSTAR

instrument can view the inner planets whereas other space telescopes cannot get close enough to the Sun. It would also be useful for serendipitous comet observations. This question was left with the science team for review and recommendation. The recommendation was favorable. At the NASA/ASI meeting December 1, 1993, this plan was discussed but it was clear that NASA could not expand our present program until it was proposed through the Discovery program.

Delivery of UVSTAR Hardware

Although the UVSTAR hardware built by Contranis in Italy had been ready for shipment in December 1993, the "political" passport was not issued until March 1994. The instrument arrived one day before Dr. Goldin visited the laboratory, giving us time to put it on display.

The Italian delivery team included:
Giuseppe Berducci
Andrea Bucconi
Gabriella Friolo
Francesco De Carlo
Antonella Perini
Fabio Roncadin
Roberto Stalio
Paolo Trampus
Franco Viola

The hardware was not in-house a week when Robin Mauk insisted it had to be tested mechanically. Although it had been assembled with temporary screws, we agreed to send it for testing. It was on the shaketable for a week before they decided they could not get anymore information from it. The test sequence included 85 vibrations. The hardware was returned to Tucson to be made flight ready. The instrument was completely disassembled to make some adjustment and begin to install the flight bolts and torque to specification.

Special Component Testing

Roller/Track Assemblies - These assemblies underwent push/pull testing to test levels of 4225 lbs. These tests have been performed and positive results were obtained. We have recently been informed that the test has to be redone to 5,003 lbs.

The Drive Screws and Nuts - These assemblies were still under scrutiny. These are safe-

life parts. Certified testing could not be done in Tucson to GSFC specifications. Consequently, the screws and nuts were sent to GSFC for testing. Both screws and nuts were destroyed in the hardness and die penetrant tests. We are in the process of reworking these items.

Graphite Epoxy Composite Rods - Robin Mauk and her consultants decided the test plan they had signed off for these rods was inadequate and that push/pull tests on each rod would be necessary. The test level is 3200 lbs., both push and pull. We are assembling the necessary equipment to do these tests.

Finding and Tracking - Our Italian collaborators took the lead in this effort. We supplied them with enough of the electronics to drive and track with the Finder and Tracker telescopes. They brought their software to our laboratory in early August. They will return when we are able to do real tracking on starfields at night. That activity will take place in a few weeks when they will return to supervise the testing activity.

Telescope Mirrors - The mirrors were delivered in early June. They were then shipped to GSFC for coating. Coating of Silicon Carbide was provided by Dr. Ritva Keski-Kuha who heads the Optical Research Program there.

The Spectrograph Grating - The gratings were also coated in Dr. Keski-Kuha's laboratory. Good reflectivity was reported.

Assembly Continues - Testing will be completed shortly and the hardware can then be reassembled for flight. This work will go swiftly because all of the parts have been fit tested already.

The spectrographs are in the assembly process as are the open channel plate detectors. They will be pumped down for outgassing next week. The following week we will attempt to focus them in the vacuum chamber. We will continue to work with the spectrographs after the instrument is delivered and finally attach them shortly before shipment to Kennedy.

Statement of Work

1) Complete testing and assemble the UVSTAR instrument for delivery to GSFC in mid-November.

2) Support safety and other reviews in the qualification efforts required to qualify the experiment for flight.

3) Support the series of Joint Integrated System training sessions.

4) Support observational planning as much as possible.

5) Provide mission observations support during the flight in July 1995.

6) Distribute data to the science team members for distribution to the community. Submit data to the PDS.

7) Receive the instrument for past flight calibration and refurbishment for 2EH2 flight.

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LUNAR AND PLANETARY LABORATORY

UVSTAR	U. of A. Spaceflight Program																	
Subsystems	1994									1995						1996		
	J F M	A M J		J A S		O N D		J F M	A M J		J A S		O N D		J F M	A M J	J A S	O N D
Italian Delivery to U. of A.	▲																	
Vibration Testing - GSFC	▲																	
Mirror Delivery		▲																
Grating Delivery		▲																
Special Tests																		
Roller/Track #1				▲														
Roller/Track #2						△												
Composite Rods						△												
Screw/Nut						△												
Electronics Complete				▲														
Thermal Vac. Test						△												
Spectrographs Bake Out						△												
Adjustment & Calibration						------		△										
CIR		IEH1 ▲							IEH2 △									
Delivery to GSFC						△												
EMI Tests								△										
Ship to KSC									△									
Launch IEH1											△							
Post-flight Calibration												△						
Safety Reviews						△[2]			△[3]									
Launch IEH2																△		

PREPARED BY:	DATE:
APPROVED BY:	DATE: